

# POPULAR Computing WEEKLY

15 July 1982 Vol 1 No 13

**35p**

**Creator on ZX81**

**1K ZX Chess**

**Vic Breakout**

**Data transfer**

**Vic  
characters**

**Spectrum  
Graphics**



**Win a ZX Spectrum  
& ZX Printer -  
details inside**

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## This Week



Cover illustration by Stuart Hughes

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## Editorial

When Clive Sinclair first launched his ZX Spectrum in April, it was widely acclaimed as a breakthrough in low cost engineering.

However, the ZX Microdrive, announced at the same time as the Spectrum, excited as much if not more interest among the microcomputing fraternity. The Microdrive, said Sinclair, could hold up to 100K bytes on a single interchangeable microfloppy, with a transfer rate of 16K bytes a second.

The Microdrive is due to be released later this year, probably in October, and will cost about £50. As with the ZX Printer, it should be possible to connect the Microdrive to other microcomputers apart from the Spectrum.

But, little has been heard of the Microdrive since it was first announced. Indeed, there has been some speculation that the Microdrive is not a disc system at all, but some form of tape storage method.

Either way, I suspect that when the Microdrive appears, it will prove to have some surprises in store.

## Next Week



Try your hand as a NASA controller as you attempt a soft landing on Jupiter in a new game called Voyager



## Texas and Atari in micro price war

THE expected micro price war has begun.

Both Texas Instruments and Atari have significantly reduced the price of their home computers.

Texas Instruments have cut the price of their 16-bit TI 99/4A machine from £115 to £109.

Irfan Salim, TI's Marketing Manager, identifies three reasons for this dramatic price drop. A quickly developing

UK market and resulting sales has allowed TI to drop their price. It has also meant that retailers can manage with a diminished profit margin. Lastly, the increasingly competitive market in Britain has been a major determining factor.

Atari, meanwhile, have cut the cost of the Atari 400 from £299.95 to £199.99. This price does not include the Basic programmer kit, now at



The competing micros.

£49.99, or the entertainment kit, now at £69.99.

## IBM used FBI to knock out competition

HITACHI and Mitsubishi have both denied that they acted illegally in acquiring information about IBM's latest computer (see PCW July 13).

It has been suggested that IBM may have involved the FBI to knock out the rival companies. IBM gave an undercover FBI agent confidential technical documents which were then used to trap the 18 accused Hitachi and Mitsubishi employees.

The case has now assumed an even greater importance. On June 30 the US Federal Grand Jury added the Hitachi company itself to the list of three accused.

Hitachi has reacted strongly to the move, denying that either it or its employees have engaged in illegal activities.

Hitachi may claim, in its defence, that its employees were entrapped by the FBI and IBM. If this were proven to be the case, its employees could not be convicted.

## Out for the count in China

TWENTY-NINE specially imported IBM computers will be used to sort data from China's national census which began on June 30.

More than 5m enumerators will be employed in this, the largest data collection exercise in history.

The IBM machines will take over four years to process the data on China's estimated 996.22m population.

## Binatone prepare £50 Woolworth's computer

BINATONE intend to produce their new 16K colour micro, which will retail at £49.95, in time for Christmas.

Gula Lalvani, chairman of Binatone points out that, although the company may not be noted for its technical innovations, it has considerable experience of consumer electronics and retail pricing and marketing.

Now convinced that the micro market is here to stay, Binatone are confident that they can produce the product.

The machine will be manufactured and quality-checked in the Far East. In the UK it will be sold as a manufacturer's mark-up considerably less than that of the Sinclair ZX81.

Binatone will rely on high-volume sales to ensure that the venture will be successful.

Next year, Binatone plan to manufacture more than 300,000 of the micros. They will be sold, with a 12-month guarantee, through the company's usual outlets, including Woolworth and Rumbelow.



Spectrum 11, still few available.

## Long wait still for Spectrum

FOLLOWING the discovery of a design fault (PCW June 17) Sinclair is still only sending out a limited number of hand-modified Spectrums.

Full production capacity could not be restored until new printed-circuit boards are manufactured. These are due in mid-August.

It seems likely that buyers will have to wait until at least the end of August before the hoped-for 28-day delivery is achieved.

## A credit to us all

AMERICAN Express in the US received over 25,000 orders for the ZX81 home computer in the first three weeks of June.

This follows the decision to sell the Sinclair machine to American Express credit cardholders through a direct mail offer.

By noon the day after the mailing 2000 orders had already been received and American Express is predicting that final sales will top 50,000.

## Computer control

AB Electronic Products Group, manufacturers of the BBC Acorn, are to join with British Leyland to produce a micro-based control system for Jaguar Cars.

## Hard talk over alleged software piracy

TWO Vic20 software suppliers have clashed following the alleged piracy of games tapes.

Audiogenic is considering taking legal proceedings against Arfon Microelectronics, following an alleged copyright infringement of the games *Atari* and *Alien Blitz*.

Martin Maynard, Audiogenic's Managing Director, saw the offending software items displayed on the Arfon stand at the Commodore show in London last month. Audiogenic has exclusive distribution rights for these games.

While Arfon insist that the games were not being offered for sale, Maynard has issued an open letter to all Commodore dealers warning of the possible breach of copyright.

Audiogenic have instructed Arfon to stop manufacture and sales of *Atari* and *Alien Blitz*, in account for any money received from such sales, and to place trade advertisements giving notification that Arfon has no rights to the products.

"We are trying to protect our market and our authors," Martin Maynard told PCW. "We need a printed retraction to reassure them. Legal proceedings will take place only if Arfon does not comply."

## Magazine plays the name-game

THE micro users newest magazine has been forced to change its name, apparently because of possible confusion between it and other publications.

July has seen lavish promotion for the new magazine from Argus Specialist Publications.

Unfortunately, the publication has appeared with several titles. On the cover it is *Personal Computing Today* but inside it is variously *Personal Computing* and *Personal Computing Monthly*.

Editor Ron Harris explained that the magazine had originally been called *Personal Computing*. "But the name has been changed to avoid confusion with an existing publication," he said.

1



# Creator

A great new game of skill for the 16K ZX81 by Simon Lane

The secret of immortality has eluded mankind down the ages. Kings and commoners alike have failed to escape the swathe of the grim reaper. Three score years and ten has remained the allotted span of a man's life.

However, a few, a very few, seem to have defied death's relentless march. Tales of Methuselah, the Fountain of Youth and the Elixir of Life, indicate that immortality is possible.

As a genetic engineer, you are attempting to discover the secret of immortality. Working with living cells, you are trying to create a cell structure that is both stable and constantly rejuvenated. Unfortunately, there are millions of possible cell combinations and no guarantee that any of them will lead to immortality.

To help you in your task, a computer simulation of human cells has been constructed. You must create your own cell structures and watch them develop over the generations to see if you have succeeded in your quest.

## Machine code

This is a machine code program for the 16K ZX81. It is based on the game of Life developed by Cambridge mathematician John Horton Conway.

The rules of the game are quite simple. Each cell on the screen has a maximum of eight possible neighbouring cells. Every cell that is adjacent to either two or three other cells will survive to the next generation. Any cell with less than two neighbours will die from isolation while any cell with four or more neighbours will die from overcrowding.

Each empty cell that is adjacent to three living cells will become a new living cell in the next generation.

Enter the program exactly as shown and Run it. The screen will go blank for a few seconds, while the machine code is loaded into memory. If you made a mistake in entering the program, the message "PARITY ERROR AT LINE 11" will appear on the screen.

When the program is entered correctly a grey border will appear round the screen with a small cross in the centre. You must move the cross around the screen, using

keys 5, 6, 7 and 8, to create your own cell structure.

Each time you move the cross, press 1 to create a living cell. If you make a mistake, press 2 to remove it.

When the initial cell structure is complete, type in R. Next, to see how the structure fares over succeeding generations, press any key apart from the Space key. When the structure ceases to evolve, press Space and the program will break.

Lines 100 to 145 contain the machine code in hexadecimal. Lines 150 to 510 Pokes the machine code into memory and line 1000 puts the computer into Fast mode.

To check that the program is working properly, enter the structure shown in the example. It evolves quite spectacularly, but repeats itself after the 25th generation.



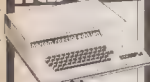






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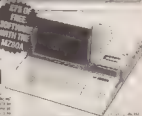
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| 16. 524288K RAM                       | 16. 524288K RAM                       |
| 17. 1048576K RAM                      | 17. 1048576K RAM                      |
| 18. 2097152K RAM                      | 18. 2097152K RAM                      |
| 19. 4194304K RAM                      | 19. 4194304K RAM                      |
| 20. 8388608K RAM                      | 20. 8388608K RAM                      |
| 21. 16777216K RAM                     | 21. 16777216K RAM                     |
| 22. 33554432K RAM                     | 22. 33554432K RAM                     |
| 23. 67108864K RAM                     | 23. 67108864K RAM                     |
| 24. 134217728K RAM                    | 24. 134217728K RAM                    |
| 25. 268435456K RAM                    | 25. 268435456K RAM                    |
| 26. 536870912K RAM                    | 26. 536870912K RAM                    |
| 27. 1073741824K RAM                   | 27. 1073741824K RAM                   |
| 28. 2147483648K RAM                   | 28. 2147483648K RAM                   |
| 29. 4294967296K RAM                   | 29. 4294967296K RAM                   |
| 30. 8589934592K RAM                   | 30. 8589934592K RAM                   |
| 31. 17179869184K RAM                  | 31. 17179869184K RAM                  |
| 32. 34359738368K RAM                  | 32. 34359738368K RAM                  |
| 33. 68719476736K RAM                  | 33. 68719476736K RAM                  |
| 34. 137438953472K RAM                 | 34. 137438953472K RAM                 |
| 35. 274877906944K RAM                 | 35. 274877906944K RAM                 |
| 36. 549755813888K RAM                 | 36. 549755813888K RAM                 |
| 37. 1099511627776K RAM                | 37. 1099511627776K RAM                |
| 38. 2199023255552K RAM                | 38. 2199023255552K RAM                |
| 39. 4398046511104K RAM                | 39. 4398046511104K RAM                |
| 40. 8796093022208K RAM                | 40. 8796093022208K RAM                |
| 41. 17592186044416K RAM               | 41. 17592186044416K RAM               |
| 42. 35184372088832K RAM               | 42. 35184372088832K RAM               |
| 43. 70368744177664K RAM               | 43. 70368744177664K RAM               |
| 44. 140737488355328K RAM              | 44. 140737488355328K RAM              |
| 45. 281474976710656K RAM              | 45. 281474976710656K RAM              |
| 46. 562949953421312K RAM              | 46. 562949953421312K RAM              |
| 47. 1125899906842624K RAM             | 47. 1125899906842624K RAM             |
| 48. 2251799813685248K RAM             | 48. 2251799813685248K RAM             |
| 49. 4503599627370496K RAM             | 49. 4503599627370496K RAM             |
| 50. 9007199254740992K RAM             | 50. 9007199254740992K RAM             |
| 51. 18014398509481984K RAM            | 51. 18014398509481984K RAM            |
| 52. 36028797018963968K RAM            | 52. 36028797018963968K RAM            |
| 53. 72057594037927936K RAM            | 53. 72057594037927936K RAM            |
| 54. 144115188075855872K RAM           | 54. 144115188075855872K RAM           |
| 55. 288230376151711744K RAM           | 55. 288230376151711744K RAM           |
| 56. 576460752303423488K RAM           | 56. 576460752303423488K RAM           |
| 57. 1152921504606846976K RAM          | 57. 1152921504606846976K RAM          |
| 58. 2305843009213693953K RAM          | 58. 2305843009213693953K RAM          |
| 59. 4611686018427387906K RAM          | 59. 4611686018427387906K RAM          |
| 60. 9223372036854775812K RAM          | 60. 9223372036854775812K RAM          |
| 61. 18446744073709551624K RAM         | 61. 18446744073709551624K RAM         |
| 62. 36893488147419103248K RAM         | 62. 36893488147419103248K RAM         |
| 63. 73786976294838206496K RAM         | 63. 73786976294838206496K RAM         |
| 64. 147573952589676412992K RAM        | 64. 147573952589676412992K RAM        |
| 65. 295147905179352825984K RAM        | 65. 295147905179352825984K RAM        |
| 66. 590295810358705651968K RAM        | 66. 590295810358705651968K RAM        |
| 67. 1180591620717411303936K RAM       | 67. 1180591620717411303936K RAM       |
| 68. 2361183241434822607872K RAM       | 68. 2361183241434822607872K RAM       |
| 69. 4722366482869645215744K RAM       | 69. 4722366482869645215744K RAM       |
| 70. 9444732965739290431488K RAM       | 70. 9444732965739290431488K RAM       |
| 71. 18889465931478580862976K RAM      | 71. 18889465931478580862976K RAM      |
| 72. 37778931862957161725952K RAM      | 72. 37778931862957161725952K RAM      |
| 73. 75557863725914323451904K RAM      | 73. 75557863725914323451904K RAM      |
| 74. 151115727451828646903808K RAM     | 74. 151115727451828646903808K RAM     |
| 75. 302231454903657293807616K RAM     | 75. 302231454903657293807616K RAM     |
| 76. 604462909807314587615232K RAM     | 76. 604462909807314587615232K RAM     |
| 77. 1208925819614629175230464K RAM    | 77. 1208925819614629175230464K RAM    |
| 78. 2417851639229258350460928K RAM    | 78. 2417851639229258350460928K RAM    |
| 79. 4835703278458516700921856K RAM    | 79. 4835703278458516700921856K RAM    |
| 80. 9671406556917033401843712K RAM    | 80. 9671406556917033401843712K RAM    |
| 81. 19342813113834066803687424K RAM   | 81. 19342813113834066803687424K RAM   |
| 82. 38685626227668133607374848K RAM   | 82. 38685626227668133607374848K RAM   |
| 83. 77371252455336267214749696K RAM   | 83. 77371252455336267214749696K RAM   |
| 84. 154742504910672534429499392K RAM  | 84. 154742504910672534429499392K RAM  |
| 85. 309485009821345068858998784K RAM  | 85. 309485009821345068858998784K RAM  |
| 86. 618970019642690137717997568K RAM  | 86. 618970019642690137717997568K RAM  |
| 87. 1237940039285380275435995136K RAM | 87. 1237940039285380275435995136K RAM |
| 88. 2475880078570760550871990272K RAM | 88. 2475880078570760550871990272K RAM |
| 89. 4951760157141521101743980544K RAM | 89. 4951760157141521101743980544K RAM |
| 90. 9903520314283042203487961088K RAM | 90. 990352031428304220                |

# Reviews

## software

### Bargain Bytes

Richard Shepherd Software, 22 Green Lays, Maidenhead Berkshire SL6 7EZ  
ZX81 16K cassette  
Price £5.00

Bargain Bytes Cassette Two is a follow up to Richard Shepherd's Bargain Bytes Cassette One. Cassette Two contains eight programs of a games and/or educational nature.

**Seafaring Adventure**, which takes three minutes to load in a standard adventure game. Set in the Mediterranean of the 19th century, you find yourself as a Royal Navy Officer in charge of a ship. You start as a Lieutenant in charge of a frigate. You have a crew of 100, food and water for 29 days and 10 tons of ammunition.

Your objective is to sink as many enemy ships as you can while out on patrol. But you must retain sufficient supplies and crew to return to port. This is where the program becomes difficult. You can only return to port when there are no enemy ships in sight. So you may want to return to port after 10 days on patrol, but you may not be able to start your return for another five days.

There are a number of hazards to be faced when trying to reach port. Some of your food may go bad, your ammunition may become unusable and some of your crew may die of disease.

If you succeed in returning to port, and have sunk a reasonable number of enemy ships, you will be promoted and given command of a larger ship. To win the game, you must attain the rank of First Sea Lord.

Other games on the cassette include *Naughts And Crosses*, *Jackpot Fruit Machine*, *Ski Run* and *Stock Market*. The *Stock Market* game will appeal to all budding entrepreneurs. You start with £10,000 and the option of buying shares in a number of different companies. The shares change in value according to the state of the market and current events affecting trade.

However, *Stock Market* begins to pall after a while, unless you are fascinated by shares and the stock market. It also takes rather too long to set up new market conditions, which leaves you facing a blank screen until the ZX81 is ready for the next round of wheeling and dealing.

The best of the other programs on the cassette is undoubtedly *General Knowledge Quiz*. There are three levels of difficulty and a range of questions in each level. You are given three possible answers to each question and asked to decide which one is correct. The only real

criticism I would make of this program is that it sometimes includes the same question twice in one round.

A novel feature of this cassette is a short test program at the beginning of side one. Before attempting to load any of the other programs, you can use the test program to check that the volume and tone levels of your tape recorder are set correctly. Simply load test and wait 25 seconds. If "Program OK" appears on the screen, you can load the other programs with confidence. If "Program OK" does not appear on the screen, adjust the volume and tone levels and try again.

#### Summary

A cassette of interesting, well documented programs that is competitively priced at £5. **80**

### Breakout

Bug-Byte, Microcomputer Software, 95-100 The Albany, Old Hall Street, Liverpool, VIC20  
Price £7.00

There must be a rule that says a rewritten version of a good old program is always better than a new program. Software writers have taken it to heart and followed it unthinkingly.

A game like *Breakout* is fine when new. After a flood of imitations have covered the same ground the game begins to look less exciting.

Another Vic in the Wall is *Breakout* for the VIC20. There is nothing wrong with the program — what it does it does very well — but it is hardly innovative.

There is a ball, three bats and a blue wall. When the ball hits the wall a brick is knocked out. When each of the bricks has failed to hit the bat you are knocked out.

Movement of the bat is precise. It is small and its corners are curved, giving the ball the illusion of being sliced when it is using the outside portions of the bat. For some reason the speed of the ball varies, more or less at random, from one hit to the next.

When you have broken through the first blue wall there is a yellow wall following it down the screen.

What happens when you break through the second wall is, unfortunately, still shrouded in mystery for this reviewer.

#### Summary

A difficult version of this standard game. It is, however, far too easy to produce new versions of old programs.

It is much more interesting to see what programmers can achieve when they do not have their bats to the wall. There is definitely a need for new ideas. **OK**

### IK ZX81 chess

Available from David Harris, 126 Southridge Rise, Crowborough, East Sussex TN8 8JL  
Price £3.00

This is one of the more interesting ZX81 tapes to pass through our office in recent weeks. As a ZX81 chess program it is very different.

The main drawback of this chess program is that it will not allow you to castle, pawn promote or capture en passant.

The cassette comes in a library case with a fly-sheet made out of a ZX printer listing. The cassette itself has its handwritten name printed in red and the obscure legend in the beginning.

The tape loads every time, without problems, in about 30 seconds. There are two versions of the game. In the first, the computer starts by moving its queen pawn forward one square. In the second version, the computer always moves its king pawn forward. The computer always plays white.

The chess board appears as a small grid in the top left hand quarter of the screen. The computer plays from the top and each square on the grid is identified by a letter and a number.

The computer looks ahead one move at a time. On the screen you see each of its pieces going through each of its possible moves. The computer gives each possible position a weighting and then makes its move.

The computer does not allow any illegal moves or cheating and so could prove useful as an introductory game for new players.

It is fascinating to see all the possible moves tried on the screen, rather than having to watch the more usual blank screen.

The greatest strength of this cassette lies in the skills which went into writing a chess game in IK of machine code. Is there anyone reading this who could even contemplate doing the same?

#### Summary

Despite the limitations this is one cassette, at £3, which I would recommend. It might not teach you a great deal about chess, but it certainly lays down a challenge to other programmers. The author is now working on a ZX version. **DS**

# Reviews

## hardware



The job that goes "bleep" . . . from Fulcrum Products

### ZX Bleep

Fulcrum Products, Hylake Street Lane, Rindon, Worthing, West Sussex (Tel: 090-671 2750)  
Price £8.95 inc VAT and postage.

A response from the keyboard of a ZX81 when a key has been pressed is the ambition of most ZX81 users who have not paid out for an additional keyboard.

This little printed circuit board will give a loud beep everytime a key is pressed and requires no soldering at all. It fits on the ZX81. It also fits underneath the keyboard of the ZX81, inside the case, so that no unsightly wires are showing and the edge connector is not blocked for the ram pack, printer etc.

The unit comes complete with a gold sticker for the top of the ZX81 saying "My ZX81 Bleeps (does yours?)".

The instructions contain diagrams on how to open the ZX81 (including the hidden screws) and how to fit the bleeper.

The keyboard five-way strip from the Sinclair keyboard must be carefully removed from the socket on the ZX81 printed-circuit board and then placed in the same type of socket on the bleeper. A five-way plastic and copper strip provided with the bleeper is then plugged into another socket on the bleeper and into the now empty socket on the ZX81. Care must be taken in fitting the Sinclair keyboard strip into its new socket as, once broken, the whole keyboard must be replaced.

Now comes the ingenious bit. The printed-circuit board requires power to work and this would normally require soldering to the printed-circuit board. However, Fulcrum have provided two little clips which fit into the holes on the printed-circuit board to make the connection. These clips could be very useful to constructors, so apply to Fulcrum if you want to get some.

#### Summary

The bleep will work when any key is pressed, not only when an input is re-

quired. It provides a good response from the keyboard everytime and is fairly easy to fit. **SA**

### Computer Handbook

The Home Computer Handbook  
By Frank Herbert and Max Bernard, Victor Gollancz, 297 pages, hardback  
Price £7.95

Now being imported from the U.S., this bulky book looks very tempting at first glance, even at £8. But first impressions can be misleading. The original American title, *Without Me You're Nothing*, seems to sum up this overblown publication.

Instead of providing clear and concise information, much of the book is taken up with a lengthy diatribe against the perils of computers in society. The authors often get so worked up about people's fears of micros that the work loses its direction.

The main thread of the book appears to be that computers have been kept in the hands of a minority for reasons too dark to disclose.

"You have been led to about computers as part of a conspiracy . . . to keep them in the hands of an elite few" is just a sample of what to expect.

Fear not, however, help is at hand. The authors advise: "You have in your hands a book that can change your life." And they continue: "We are here to help rid the world of an elitist mystique that has acted as a barrier to your understanding." It is reassuring to know that someone is looking after our interests, isn't it?

The whole book is more of the same. It is a mish-mash of jargon and mellow, not a beginner's guide to home computing.

Although the chapter headings are fairly sensible — a buyer's guide, programming, organisation — the text of the chapters is wordy. There is not much of use to a computer novice. There is a glossary of terms but no index. A few TRS-80 listings are also included.

#### Summary

The title is somewhat misleading. Take no

notice of the cover and look carefully at the contents within. You might find it of interest. But it's not of much use, however, to the new micro owner seeking a home computer handbook. **KJ**

### Incremental RAM boards

East London Robotics, Filindia House, 14 Darwell Close, East Ham, London E6 4BT (Tel: 01-471 3368).

Price: £10.50 for 8K and £11.50 for 16K boards, plus £4.93 per 2K ram chip required. 45p post required for orders under £15.

Incremental Ram boards offer an excellent way of buying just as much memory as you need for your ZX81.

The board comes socketed for four or eight 2K Ram chips (6116a) and both boards fit inside the ZX81. The method of fitting the boards requires absolutely no soldering as the connections are made to the ZX81 by plugging the Z80A board processor into a socket on the Ram board and plugging the board into the empty socket on the ZX81. The other connections required are by screws which secure the Ram board to the printed-circuit board of the ZX81 using the holes already present.

The instructions on fitting the Ram board cover almost every eventuality and are very easy to follow. The only problem comes when trying to find the holes the screws should go in as there is no diagram to help, only one of the Ram board itself.

Although it may seem an expensive way to buy Ram, all the memory is static and does not require refreshing like dynamic Ram packs.

The other advantage is that it can be altered to suit other Ram packs via a set of wire plugs and sockets on the board to be in any part of the 64K memory map of the ZX81. It can even be disconnected from the memory map without removing the board.

It is a simple system to set up and the Ram can be added to at any time with further 2K Ram chips. This makes it valuable for anyone who cannot afford to buy much Ram at one go, but wishes to build up memory little by little as funds become available.

The Ram can be moved to provide machine-code space anywhere from 8K to 48K (something other Rams cannot do) and could even be paged if required.

#### Summary

Well worth the money as it eliminates Ram waste and refreshing problems. It is easy to fit and it can be moved to any position in the memory map. **SA**

# Street Life

## Chain reaction In the booming micro market

*David Kelly looks at the way micros are being sold in the high street stores.*

Microcomputers are emerging at last from the dominance of the faceless distribution and mail-order companies. It is now possible to buy most microcomputers over the counter in high street stores.

Dixons have just spent £150,000 on promotion for the Vic20, which is being sold in 200 of its stores. Their advertisements give a telephone number to ring for the nearest stockist, but the gist on the other end of the line knew little about the Vic20. "Try our Oxford Street store — I imagine they would stock it — they stock everything else."

The Dixons' shop assistant who eventually offered to demonstrate the Vic20 was a bit out of his depth. He explained that it had sound, colour and an ample memory, but he had no software to show. He tried to Run a one-line program to print the word "hello".

It is not for a minute intended to suggest that this is a problem peculiar to Dixons. It affects all over-the-counter microcomputer sales. Selling a micro is not easy.

Terry Steel, spokesman for Boots, said succinctly: "Selling a micro is not like selling a new piece of garden furniture."

Boots also sells the Vic20. This is a comparatively new venture for the company. The idea was first considered six months ago when Boots undertook a reorganisation of the audio department range.

"We feel it is a fast expanding market and we are well placed to export it," explained Terry Steel. "We chose to specialise in one or two areas, rather than cover the whole field."

By only stocking the Vic20 and the £195iVA, Boots hope to do the machines justice.

The micros are only on sale in Boots' top 70 branches at the moment. At least one staff member in each branch has been specially trained by Boots to sell the micros.

W H Smiths were one of the first major chain stores to begin selling micros.

In September 1980 they conducted a regional survey of computer magazine sales. After analysing the results, W H Smiths began to place computer books and magazines together, sometimes with



W H Smiths, John Roland, of Bognor, who is pioneering the computer boutique.

a heli running demonstration programs nearby.

Now, 20 months later, W H Smiths is well established in micro retailing, having arranged with Sindar Research to sell the ZX81 machine. They began selling the ZX81 in September 1981. Initially the ZX81 was sold through 120 stores, but now it is available in any store sold in a population centre of over 50,000.

John Roland, market development manager for W H Smiths, explained: "When you are starting out in a new product field it is important to start with something nice and simple. The ZX81 has some super features for beginners."

Commenting on the success of the line he said: "The ZX81's return per foot store area means that it more than earns its keep on the shelves."

W H Smiths obviously see a long-term future for selling computers in its stores. So far, more than 400 staff have been sent on a full-time residential micro training course.

W H Smiths have pioneered the idea of a "computer boutique" selling a whole range of computer-related products. They offer magazines, books, the ZX81 and its add-ons, and a wide selection of ZX81 software. Says John Roland: "Our philosophy has always been — if you are going to have a machine you must support it totally."

Ordering a microcomputer through a mail-order company is often an unsatisfactory experience, since you have to buy the goods unseen. Buying through a shop, therefore, has to be an improvement. There is at least one fair touch: the keyboard and prod the casing.

Putting the micro through its paces for a potential purchaser is much more difficult. It is not like a garden chair. You cannot just

look at it and understand completely. For many first-time buyers, microcomputers are a mystery which needs to be explained.

It is important that the retail shops should offer an informed, integrated approach to micro selling. Those stores which succeed will, at present, be those who offer what a mail-order company does not.

They will be able to de-mystify the micro and provide a continuing source of help and advice coupled with a selection of back-up software and add-ons.

### What's happening

**Mid-Cheshire Computer Club** throws down the gauntlet! Dave Clare reckons his club can beat any other in the Computer Challenge Match he plans for Friday August 28. Anyone is eligible to join the competition who is willing to try to beat the home team. Dave also wants to hear from clubs in the northwest who could field a team as part of a possible North West League. Contact Dave Clare, 222 Townfields Road, Winsford, Cheshire (Tel: 06065 51374).

**Bognor Computer Club (BUG)** meets at 7.30 pm on the last Thursday of each month in the RAFA Club. Entry is 50p per session. Contact Neil Vass, Greys Cottage, 35 Aldwick Avenue, Bognor Regis (Tel: 0243 865451).

**Gwent Amateur Computer Club** meets on most Thursday evenings at 7.30 pm in Mary's Institute, Stow Hill, Newport. Contact Ian Hazel, 50 Ringwood Hill, Newport, Gwent.

# Open Forum

Open Forum is for you to publish your programs and ideas

It is important that your programs are bug free before you send them in. We cannot test all of them.

Contributions should be sent to: Popular Computing Weekly, Hobhouse Court,

19 Whitcomb Street, London WC2H 7HH

## How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.

(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.

The program will be well documented, the documentation being typed with a double spacing between each line. The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing.

Please enclose a stamped, self-addressed envelope

## Spy Hunt

on Vis-20

In this game a spy is hidden behind one of 78 bushes — using logic and geometric insight, or just plain guesswork, you have to locate the spy.

You are at the bush that is flashing and you can either press Asterisk or move to another bush by using U, D, R or L. When you press \* a number appears telling you approximately how far away the spy is from you.

In fact the number shown is INT (distance between you and spy), so that the spy is between D and D+1 away from you where D is the number showing. Try and find the spy in as few guesses as you can. If you're clever or lucky you should be able to do it in about three guesses.

The display is arranged so that no two bushes are more than nine units apart — you could create a larger display but then

turn to next page

PROGRAM OF THE WEEK

Spy Hunt  
by Graeme Knapton

Continues next page

# Open Forum

from previous page

you'll need to use hexadecimal for distances of 10 and over.

The program will run on any Vtc20 with or without any memory expansion — line 100 takes care of the various changes that happen when 8K or more memory is added.

## Highway Code

on ZX81

This program for a ZX81 models the relation between the speed of a car and the time needed to avoid a hazard in the road. Allowance is made for 'thinking time' preparatory to braking. The result is given as either 'no time to brake', velocity on impact or distance between stopping and the hazard.

The formulae employed are the normal equations for rectilinear velocity and acceleration. The deceleration factor is that quoted in the Highway Code for optimum weather conditions.

The early lines draw a diagram and give a description of the problem. The program takes about 1.5K of memory, but could be run on an unexpanded ZX81 by starting at line 300. It should be useful to learner drivers, and underlines the lessons in the Highway Code.

## Reaction Test

on ZX81

I wrote the program to evaluate the effect of alcohol on reaction times, but due to excessive programming I have not had a chance to get around to the 'alcohol test'.

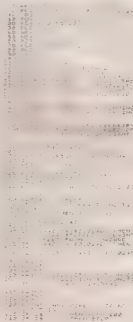
The program is aesthetically pleasing and evaluates the results of ten reaction tests. The results are given both numerically and on a histogram, using the entire screen. The axes of the graph are automatically scaled and cover the maximum to minimum results (+ and -10%).

In order to appear as a game, I have allowed the fastest entrant to enter his/her name.

Anyone wishing to make the timing more accurate may adjust the 02 in line 3010, although it is quite accurate up to 10 seconds. Lines 0, 1 and 2 also may be omitted.

turn to next page

Highway Code  
by Frank Williams



Reaction Test  
by Ian Carson

```

00 PRINT AT 11.0
01 CHRON MAY 1982
02 FOR G=1 TO 50
03 NEXT G
04 CLS
05 GET P=100000
06 DIM H(10)
07 CLS

```

COPYRIGHT

```

20 GOTO
40 LET C=100000
60 LET C=10

```



## Open Forum

```

100 PRINT AT 1,2 REACTION TEST
110 GOTO 120
120 PRINT "*****"
130 GOTO 140
140 PRINT AT 4,0 THIS PROGRAM
150 WILL DISPLAY THE
160 PRINT AT 6,0 RESULTS OF 1
170 REACTION TESTS.
180 PRINT AT 8,0 WHEN THE
190 KEY IS PRESSED A
200 PRINT ANCHOR NUMBER WILL
210 BE IN THE
220 PRINT "BOX BELOW, YOU MUST
230 ENTER THE
240 PRINT "NUMBER AS QUICKLY AS
250 POSSIBLE. THIS WILL CONTINUE
260 UNTIL YOU PRESS THE COMPLETE

```

0001 PRINT AT 16 16  
0002 PRINT AT 18 18  
0003 PRINT AT 20 20  
0004 PRINT AT 22 22  
0005 PRINT AT 24 24  
0006 END

THINKING OF YOU

[illegible][illegible][illegible]

```

020 LET R=0
030 FOR K=1 TO 10
040 LET NIK=INT (100*(1-K)/100)
    IF 1000
050 IF NIK=0 THEN LET R=N(K)
060 IF NIK>5 THEN LET S=N(K)
070 LET R=N(NIK)
080 NEXT K
090 LET R=S-100-100*(100-1)

```

```

PRINT AT 7.11.6
PRINT AT 9.11.5
PRINT AT 12.11.4
LET B = INT (100 * (9 + 10) / 10)
      - INT (100 * (2.11 + 10) / 1)
PRINT AT 13.11.3
PRINT AT 15.11.2
PRINT AT 11.11.1 C=C*2
FOR C = 1 TO 10
  PRINT C
  LET C = INKEY$
NEXT C
PRINT AT 2 TO E+1

```

```

100  PLOT 4, -1.249, 1
101  NEXT M
102  IF @ THEN GOTO 5000
103  IF @ THEN LET F=F+1
104  PRINT AT 16 0 "FASTEST RUN"

```

```

0000 PRINT AT 20 1. Bx As
0001 IF L=0 GOTO 20
0002 GOTO 30
0003 LET H=0
0004 LET B=0
0005 LET C=0
0006 LET D=0

```

|     |     |   |    |   |   |
|-----|-----|---|----|---|---|
| 20  | POP | 0 | 10 | 0 | 0 |
| 21  | POP | 0 | 10 | 0 | 0 |
| 22  | POP | 0 | 10 | 0 | 0 |
| 23  | POP | 0 | 10 | 0 | 0 |
| 24  | POP | 0 | 10 | 0 | 0 |
| 25  | POP | 0 | 10 | 0 | 0 |
| 26  | POP | 0 | 10 | 0 | 0 |
| 27  | POP | 0 | 10 | 0 | 0 |
| 28  | POP | 0 | 10 | 0 | 0 |
| 29  | POP | 0 | 10 | 0 | 0 |
| 30  | POP | 0 | 10 | 0 | 0 |
| 31  | POP | 0 | 10 | 0 | 0 |
| 32  | POP | 0 | 10 | 0 | 0 |
| 33  | POP | 0 | 10 | 0 | 0 |
| 34  | POP | 0 | 10 | 0 | 0 |
| 35  | POP | 0 | 10 | 0 | 0 |
| 36  | POP | 0 | 10 | 0 | 0 |
| 37  | POP | 0 | 10 | 0 | 0 |
| 38  | POP | 0 | 10 | 0 | 0 |
| 39  | POP | 0 | 10 | 0 | 0 |
| 40  | POP | 0 | 10 | 0 | 0 |
| 41  | POP | 0 | 10 | 0 | 0 |
| 42  | POP | 0 | 10 | 0 | 0 |
| 43  | POP | 0 | 10 | 0 | 0 |
| 44  | POP | 0 | 10 | 0 | 0 |
| 45  | POP | 0 | 10 | 0 | 0 |
| 46  | POP | 0 | 10 | 0 | 0 |
| 47  | POP | 0 | 10 | 0 | 0 |
| 48  | POP | 0 | 10 | 0 | 0 |
| 49  | POP | 0 | 10 | 0 | 0 |
| 50  | POP | 0 | 10 | 0 | 0 |
| 51  | POP | 0 | 10 | 0 | 0 |
| 52  | POP | 0 | 10 | 0 | 0 |
| 53  | POP | 0 | 10 | 0 | 0 |
| 54  | POP | 0 | 10 | 0 | 0 |
| 55  | POP | 0 | 10 | 0 | 0 |
| 56  | POP | 0 | 10 | 0 | 0 |
| 57  | POP | 0 | 10 | 0 | 0 |
| 58  | POP | 0 | 10 | 0 | 0 |
| 59  | POP | 0 | 10 | 0 | 0 |
| 60  | POP | 0 | 10 | 0 | 0 |
| 61  | POP | 0 | 10 | 0 | 0 |
| 62  | POP | 0 | 10 | 0 | 0 |
| 63  | POP | 0 | 10 | 0 | 0 |
| 64  | POP | 0 | 10 | 0 | 0 |
| 65  | POP | 0 | 10 | 0 | 0 |
| 66  | POP | 0 | 10 | 0 | 0 |
| 67  | POP | 0 | 10 | 0 | 0 |
| 68  | POP | 0 | 10 | 0 | 0 |
| 69  | POP | 0 | 10 | 0 | 0 |
| 70  | POP | 0 | 10 | 0 | 0 |
| 71  | POP | 0 | 10 | 0 | 0 |
| 72  | POP | 0 | 10 | 0 | 0 |
| 73  | POP | 0 | 10 | 0 | 0 |
| 74  | POP | 0 | 10 | 0 | 0 |
| 75  | POP | 0 | 10 | 0 | 0 |
| 76  | POP | 0 | 10 | 0 | 0 |
| 77  | POP | 0 | 10 | 0 | 0 |
| 78  | POP | 0 | 10 | 0 | 0 |
| 79  | POP | 0 | 10 | 0 | 0 |
| 80  | POP | 0 | 10 | 0 | 0 |
| 81  | POP | 0 | 10 | 0 | 0 |
| 82  | POP | 0 | 10 | 0 | 0 |
| 83  | POP | 0 | 10 | 0 | 0 |
| 84  | POP | 0 | 10 | 0 | 0 |
| 85  | POP | 0 | 10 | 0 | 0 |
| 86  | POP | 0 | 10 | 0 | 0 |
| 87  | POP | 0 | 10 | 0 | 0 |
| 88  | POP | 0 | 10 | 0 | 0 |
| 89  | POP | 0 | 10 | 0 | 0 |
| 90  | POP | 0 | 10 | 0 | 0 |
| 91  | POP | 0 | 10 | 0 | 0 |
| 92  | POP | 0 | 10 | 0 | 0 |
| 93  | POP | 0 | 10 | 0 | 0 |
| 94  | POP | 0 | 10 | 0 | 0 |
| 95  | POP | 0 | 10 | 0 | 0 |
| 96  | POP | 0 | 10 | 0 | 0 |
| 97  | POP | 0 | 10 | 0 | 0 |
| 98  | POP | 0 | 10 | 0 | 0 |
| 99  | POP | 0 | 10 | 0 | 0 |
| 100 |     |   |    |   |   |

```

140 NEXT D
150 IF A = 1 THEN GOTO 100
160 IF A = 2 THEN GOTO 100
170 IF A = 3 THEN GOTO 100
180 IF A = 4 THEN GOTO 100
190 IF A = 5 THEN GOTO 100
200 IF A = 6 THEN GOTO 100
210 IF A = 7 THEN GOTO 100
220 IF A = 8 THEN GOTO 100
230 IF A = 9 THEN GOTO 100
240 IF A = 10 THEN GOTO 100
250 NEXT D
260 GOTO 100

```

REACTION TEST BY I. ...

THIS PROGRAMME WILL DISPLAY THE  
RESULTS OF TEN REACTION TESTS.

WHEN THE 8' KEY IS PRESSED A  
RANDOM NUMBER WILL APPEAR IN THE  
BOX BELOW. YOU MUST RE-ENTER THE  
NUMBER AS QUICKLY AS POSSIBLE.  
THIS WILL CONTINUE UNTIL THE TE  
-574 ARE COMPLETE

NUMBER 1 - 

**ACTION TEST**

| RESULTS | 1 | 2 | 3 | 4 |
|---------|---|---|---|---|
|---------|---|---|---|---|

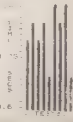
```
POSTEST = 0.7
PRETEST = 0.9
```

4. RANGE - 0.01 0.15

FASTEST AVERAGE

8.76

LY 1AN CARSON 0.6 -  - TEST 2







# Open Forum

from previous page

restore the usual character, type FOR I = 8400 TO 8407: POKE I, 255: NEXT I and ENTER.

Care should be taken when entering your own characters not to overwrite these locations. Should it be necessary to press STOP at any time, the computer will revert to reading the Rom characters. To restore your own characters simply POKE 36860, PEEK (36860) or 13.

## Hangman

on Vic

This is a normal hangman program. After starting the program the asterisks on the screen denote each letter in the word. The player types a letter into the computer. If it is correct the letter appears in the correct position in this word.

If it is wrong, part of the scaffold is built and the wrong letter appears below the asterisks.

The words are kept in data statements

between lines 1000 and 5000. The number of words put in data statements must be counted and entered on line 60 (NW).

## Reverses

on Vic

This program reverses any non-reversed characters on the screen and un-reverses any already reversed characters. It fits easily into an unexpanded Vic20.

Line 10 sets the screen for an unexpanded Vic. The first position on the screen is 7680.

Line 20 tests for additional memory by Peeking into 4096. On an unexpanded Vic this always contains 0. If the Vic is expanded the screen starts at 4096 and the variable A is set to 4096.

Line 30 starts the loop.

Line 40 tests for a reversed character and un-reverses it if it is. Then it goes to the next character.

Line 50 reverses any un-reversed characters.

Line 60 completes the loop.

```
5: REVERSE PROGRAM BY R. W.
10: A = 7680
20: IF PEEK(4096) = 0 THEN A = 4096
30: FOR I = A TO A + 500
40: IF PEEK(I) > 127 THEN POKE I,
    PEEK(I) XOR 255
50: POKE I, PEEK(I)
60: NEXT I
```

## Anagram Birds

on Vic

This program is designed to help children spell. The Anagram Bird lays eggs which explode into a jumble of letters. Twenty seconds are given to work out what the word is.

After each word has been guessed the screen clears to show the correct answer and shows how many guesses are correct and incorrect.

Words are stored between lines 1000 and 2000. Line 480 indicates the number of words and has to be altered accordingly.

Hangman

by David Pounder

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# Open Forum

## Anagram Birds by David Pountner

and the other birds are  
hidden in the picture



and the other birds are  
hidden in the picture



and the other birds are  
hidden in the picture



and the other birds are  
hidden in the picture

## Win the great new ZX Spectrum

All you have to do to enter this award scheme is send us a program in one of the following categories: (a) Games; (b) Educational/Scientific; (c) Business/Office; (d) Utility.

Programs for each category should be accompanied by a cassette, a copy of the listing and full documentation. Points will be awarded for use of machine code, innovation, structure and ease of use.

The overall winner will receive a ZX Spectrum and Printer. Individual category winners will be awarded £30 of software, and 24 runners-up will receive programming merit awards.

A competition coupon will be published in each issue of Popular Computing Weekly for the next two weeks. To enter the competition, you must send in your program together with any four differently numbered coupons to:

Popular Computing Weekly,  
Programming Award Scheme,  
Hobhouse Court,  
19 Whitcomb Street,  
London WC2.

- Rules
1. There is no limit on the number of entries you can send in, but each entry must be accompanied by four differently numbered competition coupons.
  2. Closing date for entries is August 10, 1982.

3. The names of the winners will be announced in the September 18 issue of Popular Computing Weekly.
4. The Judges' decision is final.
5. No employees of Sunshine Publications Ltd or their families will be eligible to enter the competition.



## Popular Computing Weekly Programming Award Scheme

Fit in this coupon. When you have collected four differently numbered coupons, send them with your program to: Popular Computing Weekly, Programming Award Scheme, Hobhouse Court, 19 Whitcomb Street, London WC2.

NAME: .....

ADDRESS: .....

.....

.....

.....

PROGRAM CATEGORY: .....



# Programming

## Basic rewards to be found in Ramtop

Nick Godwin explains how you can transfer data from one program to another.

When you first buy a 16K Ram pack for the ZX81 its potential seems enormous. Indeed, compared with the initial 1K machine, it is considerable. Nevertheless it has limits, which can show themselves surprisingly quickly if you stick to Basic.

One way of expanding the effective capacity of the ZX81's Ram is in team machine-code. For many people, however, this task is simply too daunting. Having grappled with Basic, the prospect of repeating the process with an unfamiliar and more complicated computer language may be off-putting.

Another method of expanding the effectiveness of the Ram is to physically expand it by means of the various jump expansion boards which can now be purchased. However, that is not always financially feasible.

### Ram Barrier

There is a third way of breaking the Ram barrier, which is to make use of Ramtop. Most all that is published about Ramtop seems to imply that its main application is in connection with machine code: if you are one of the many ZX81 users who has decided to stick to Basic, you may have dismissed it as being of no use for your purposes. However, Ramtop can be extremely useful in Basic programming.

Ramtop can be used to transfer data from one program to another. First it is necessary to set Ramtop at some convenient address. Ramtop can be set at any address between 16509 and 32768: it represents the top of the area of Ram that can be used for Basic programming.

Whatever exists above Ramtop is unaffected by Save, Load, Clear and New. The only way it can be changed, apart from switching the power off, is by using Poke. The following program enables the address of Ramtop to be set as required.

```
10 SAVE "RAMTOP"
20 PRINT "RAMTOP" + PEEK 16380 + 256 * PEEK 16381
30 INPUT R
40 IF R = 0 THEN NEW
50 LET A = INT (R/256)
60 LET R = R - 256 * A
70 POKE 16380 R
80 POKE 16381 R
90 GOTO 20
```

To save this program, first set your tape-recorder to record and switch it on

then Run. Do not Run the program before Saving it, as it erases itself after completing the operation.

To use the program, first Load "Ramtop". The present address of Ramtop (probably 32768) is displayed at the top of the screen. Enter the address required, and check the display. If the display is incorrect, enter the correct number. If the display is correct, enter zero. The program will promptly disappear. To check that Ramtop has been correctly set, use the following direct command:

```
PRINT PEEK 16380 + 256 * PEEK 16381
```

The display should equal the number that you entered, not zero.

In order to transfer a screen image from one program to another, Ramtop should be set no higher than 32064. Load the program from which you want to transfer the data, and add the following subroutine to it:

```
9910 LET R = PEEK 16380 + 256 * PEEK 16381
9920 LET I = 1 - R / 16384 + 256 * (R / 16384)
9930 FOR J = 0 TO 79
9940 POKE R + J, PEEK R + J + 64 * (R / 16384)
9950 NEXT J
9960 RETURN
```

You must provide some means of access to this subroutine in your program. This should be arranged so that it can be activated when the required display is on the screen. This could be done automatically at some predetermined point in the program by entering the line: GOSUB 9900. Alternatively, it could consist of some control facility at a convenient string input.

```
1000 INPUT S
1010 IF S = "S" THEN GOSUB 9900
1020 IF S = "S" THEN GOSUB 9900
```

If your program normally operates in Save mode, you may prefer to modify the subroutine so that it operates in Fast. Add the following lines:

```
9900 FAST
9901 GOTO 9910
```

Once you have operated the subroutine, Stop the program. If you want to Save the program do so now. Next, Load the program to which you want to transfer the image or, if you want to write an entirely new program around the image, press New. In either case, the image will be preserved in its location above Ramtop.

The data can now be called down into a string, or printed directly onto the screen, if you want to call the data onto the screen, write the following lines:

```
10 LET R = PEEK 16380 + 256 * PEEK 16381
20 FOR I = 1 TO 80
30 PRINT CHR$(PEEK R)
40 NEXT I
```

Run the program or, if you have other data to preserve, GOTO 10.

To call the data into a string, enter the following lines:

```
10 LET R = PEEK 16380 + 256 * PEEK 16381
20 LET S =
```

```
30 FOR I = 1 TO 80
40 LET S = S + CHR$(PEEK R)
50 NEXT I
```

Any string can be substituted in place of S. Again, either Run the routine or use GOTO 10. The effectiveness of the routine can be tested by the command: PRINT S.

To transfer a set of numbers from one program to another, you follow a similar procedure. For demonstration purposes, I have assumed that the data you wish to transfer is contained in a variable array X(1); where n is the number of elements in the array. The same principle applies for individual variable names, but it is important to ensure that they are dealt with in the same order on the outgoing and the incoming programs.

First, at before, set Ramtop at some convenient level. The exact level required will depend upon the total number of digits plus the total number of variables. However, so long as you leave plenty of room, you should have no trouble.

Load the program from which you wish to transfer the data, then execute the following lines:

```
10 LET R = PEEK 16380 + 256 * PEEK 16381
20 FOR I = 1 TO n
30 LET X(I) = STR$(X(I))
40 FOR R = R TO R + LEN(X(I) - 1)
50 IF R = 255 THEN STOP
60 POKE R, 0
70 LET X(I) = X(I) TO 1
80 NEXT I
90 POKE R, 128
100 LET R = R + 1
110 NEXT I
```

Line 50 is a check that you have set Ramtop low enough. If not, the routine will Stop with report code 6/50. In such a case, you should Save the program, reset Ramtop at a lower level, reload the program and GOTO 10.

When this routine has been successfully operated, Load the program to which you want to transfer the data. If you want to write a new program based upon this set of data, operate New. In either case, the data remains stored intact above Ramtop. Enter the following routine:

```
10 LET R = PEEK 16380 + 256 * PEEK 16381
20 DIM X(1)
30 FOR I = 1 TO n
40 LET X(I) =
50 IF PEEK R = 128 THEN GOTO 80
60 LET X(I) = CHR$(PEEK R)
70 LET R = R + 1
80 GOTO 50
90 LET X(I) = VAL(X)
100 LET R = R + 1
110 NEXT I
```

Remember that n = the number of elements in your original array. Once you execute this routine, X(n) will contain the original data. This can be tested as follows:

```
10 FOR I = 1 TO n
20 PRINT X(I)
30 NEXT I
40 STOP
```

to next page

# Spectrum

If more than 22 elements of data are involved, it will be necessary to operate Cont for every 22 lines of display.

To transfer a machine code routine, you must again set Ramlog to some convenient level. This should be far enough below 32768 to accommodate one byte for each machine code element.

Load the program from which you want to transfer the machine code. I have assumed that the machine code is held in a Rem statement in line 1, but the program can be adapted by adding the initial value of I in line 9010. This initial value must be the address prior to the address at which the machine code starts. The line numbers of the following routine are optional:

```
0009 LET N=PEEK 16384+384+PEEK 16388
0010 LET I=16543
0019 LET I=I+1
0030 IF N=32768 THEN STOP
0040 POWER=I*PI*H4
0050 B=I*PI*H4/N THEN STOP
0060 LET N=N+1
0070 GOTO 0009
```

Run 9000. If executed correctly, the routine should Stop with report code 9 0050. If it Stops with report code 0 0030 then you have not allowed enough bytes above Ramtop. In that case, Save the program, reset Ramtop to a lower level and rerun the program.

The next step is to load the program to which you want to transfer the machine code routine. Alternatively, enter New. Assuming that you want to hold the machine code routine in a Rem statement in line 1, you must prepare space to hold it according to normal practice.

1. **HOW MUCH?** — As many as there are elements in the machine codes.

Note that the next routine enables you to estimate the number of  $X_d \sim \text{maxcurves}$  will not cause havoc. Enter the following lines:

```

0000 LET I=10512
0010 LET R=PEEK H0000+256-PEEK H0000
0020 LET I=I+1
0030 IF PEEK R=110 THEN STOP
0040 IF PEEK I=10 THEN STOP
0050 POKE I,PEEK R
0060 LET R=R+1
0070 GOTO 0000

```

If executed properly, the program will Stop with report code 96030. If 4 Steps with report code 96040 then you have not allowed enough room in line 1. So edit line 1 and edit in more Xs, then GOTO 9000. Any surplus Xs remaining at the end of line 1 after execution of the routine can be Edited out.

The address of the first element of the machine code routine will be 16514, or 1 more than the value of 1 as set at line 1000.

**NEXT WEEK:** Simulating the upper and lower case functions.

## Seeing curves where none really exist

**Malcolm Davison** explains how to draw a curve that is not really there.

While the Spectrum's Circle instruction neatly draws an outline circle, drawing a solid circle of colour is not so straightforward. However, this program does the job.

Attractive designs may be created by introducing new co-ordinates, new circle radii and changing the ink colours. To make this easier, you should add line 210 GOTO 4 and introduce an input for the ink colour.

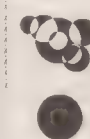
[illegible]

Fig. 1

[illegible]

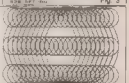
Fig. 2

Incidentally, it takes approximately 30 seconds to draw a 50 pixel circle, which shows how slow the Spectrum is.

The second program does make use of the Spectrum's Colour facility. It will print an array of fields with a black border and a white line on a blue background. It is called `Line & CLS` the Spectrum will lock on to the correct colours when the program is first run.

With a bit of practice, it should be quite easy to produce the Olympic Games symbol.

The final program is based on an old idea to brighten up school geometry lessons. This program deceives the eye into seeing curves where none actually exist. The road line Mark on a cyan background with a black border, but there can be changed to suit your own taste. A C++ comment on line 3 would be a useful, though not essential, addition.

[illegible]





# Peek & poke

Peek your problems to our address. Ian Beardmore will poke back an answer.

## WHAT'S YOUR GAME COMMODORE, EN?

Graham Allen of Broomage Park, Larbert, Scotland writes:

**Q** Could you please tell me how the Vic30 compares to the Vic20? Does it have the colour, the famous Pet graphics, the sound? Can Vic30 programs run on it? Is Vic30 pre-packaged software compatible with the Vic30?

**A** Commodore have created some confusion by re-naming their new family of computers after the Vic. The Vic30, the Vic30 and the Commodore 64, are a family of computers that are related in the Vic20, but are more geared to the games end of the market.

From what is known of the Vic30, it will have 128K on-board Ram, far better sound and graphics. It should be able to support all the Vic20 peripherals, including two joysticks, and up to four paddles. Ultramax cartridges should run on it, but probably not ordinary Vic20 cassettes. The Vic30 will most likely have a new version of Pet Basic, with no dimensioning of arrays.

It looks to be an excellent games machine that will turn out to be an acceptable computer as well. With a price tag around the £250 mark, one cannot help wondering whether or not it is aimed to go into competition with the Atari 400.

## NO JOY OUT IN THE STICKS

David Rappert of Cyned Road, Cardiff writes:

**Q** I have purchased a ZX Spectrum. I would like to know if the Micro-Ges joysticks for the ZX81 will work on it.

**A** According to Micro-Ges the answer is no. At the moment there is, in my knowledge, no joystick available for the ZX Spectrum, but it is early days yet.

Micro-Ges will be bringing out a joystick for the Spectrum

in the next few months, but they are waiting until there are sufficient Spectrums on the market. It would seem that their mission is well founded, judging by the delays we have already seen in the Spectrum delivery dates.

It is most likely that the Spectrum joystick will be similar to the ZX81 joystick, so that it will effectively be in two parts—a controller board and the joystick proper.

## IS IT WORTH IT, WE ASK

J. J. Montgomery, of Hampstead, London writes:

**Q** I am a BBC micro model B user and I am looking for a printer. In your magazine recently I saw an advertisement by Microtanic Software, which claims that you can add a printer to your BBC system, for less than £50 via their Printerface unit. In their list of computers they include the BBC micro.

Could you investigate their claims. How efficient is the Printerface and can the ZX printer cope with the BBC Hi-res graphics? If not, do you know of any other suitable printer for under £250?

**A** Printers, like computers, are often a matter of personal choice. The ZX printer uses an aluminium coated paper that is hot inches wide. The characters are quoted onto the metal film in two quickly revolving cylinders. It will at best only make an adequate job of the Hi-res graphics on your BBC micro.

If you do have £250 to spend, then I would suggest that you take a look at the Sekissha GP-80. This is an 80-column dot matrix printer and just fits within your budget. The printer has been quite widely advertised in the computer press, but you might find it best if you write and ask for further details. The address is: Micro Peripherals, 61 New Market Square, Basingstoke, Hampshire RG21 1HW.

The GP-80 should make quite a good job of the Hi-res

graphics. It is a paper printer that can be interfaced to other computers, but it costs more than twice as much as the ZX Printerface. When it comes down to it, I can only say that it is a low money and low decision.

## YOU MUST BOOK UP YOUR IDEAS

Miss V. Allen, of Stockton Lane, York writes:

**Q** I am interested in computer programming and would appreciate it if you could give me some examples of flow charts and programs.

**A** This quite simple question could be answered more easily in a book. If, as I assume, you are new to micro-computing, I would suggest that you seriously consider getting a computer. Without a computer, books quickly become frustrating or meaningless.

As for computer programs, we publish about six pages of them every week. Most books on computers, and probably all the magazines, have examples of computer programs.

If you are looking for a book that combines both programs and flow charts, you should realise that many books published for the home computer user do not deal with flow charts. This is because many hobbyists, who have not had any computer instruction at school, do not use them.

One book that does combine both flow charts and the development of programming skills is *Computer Programming in Basic* by Peter High. Published by Nelson, it is used in some schools as an O level textbook and would make a good computer introduction.

## IT'S ENOUGH TO MAKE YOU JACK IT IN

Norrid Harque of Donnade Road, Walsingham, writes:

**Q** I bought a ZX81 about three months ago. Ever since I have had a problem with the 3-pin jack plug from the main adaptor. It does not fit exactly into the socket and it wobbles. It is pretty

annoying when this happens in the middle of a program and it crashes. I do not want to send it back because it will take a long time. Could you please tell me what to do?

**A** This is the sort of Catch 22 that many Sinclair owners find themselves in—dare I or dare not I send my computer back. In this case, experience has shown that even if you did, it might well come back with no appreciable differences.

There are two things you can do. Firstly, take the case apart. This is quite easy, as long as you remember that three of the screws holding the case together are under the rubber feet.

Next, loosen the PCB, which will give you access to the sockets. Using a small screwdriver, depress the clips in the positive input socket. This should give you a better connection, but unfortunately it does not always work.

If you get really desperate, cut a hole in the case on the slope below the N of ZX81. Open up the socket clips and take the power from the jack plug to the clips using small crocodile clips.

Warning—firmly, the case is surprisingly thick at this point. It will take time and care to cut through it. Secondly, there will be extra wires that might interfere with the LOAD/SAVE leads if you are not careful. Thirdly, keep a wedge of insulating tape between the two crocodile clips, or you might short out the power supply.

It sounds complicated, but as long as you are careful it is quite straightforward. But, remember that it does make your guarantee void.

## ● Stop agonising over that

problem. Write to Ian Beardmore, Peek & Poke. Popular Computing Weekly, Holthouse Court, 19 Whitcomb Street, London WC2 7HF.

# Competitions

## Easy as falling off a log?

by Gordon Lee

When programming, you will probably have found the IF/THEN Basic command to be one of the most useful.

However, the command, in some circumstances, has to be used with care. Consider the following example (for the ZX81 but applicable to other machines). Key in as a direct command [ $**$  is the power symbol]:

```
IF 3+3=27 THEN PRINT "HOGRAY"
```

Did your computer print "Hogray"? If it did not let us try to see why not.

Key in:  
PRINT 3+3=27.

This gives a display of 27, yet the computer has just rejected this in the IF/THEN statement. Now key in:  
PRINT 3+3=27.

Instead of the expected result of zero, you should see displayed 1.4991161 E-8. This should now give us a clue as to what has been happening.

If you are unfamiliar with scientific notation you will probably be puzzled by this strange number with the letter 'E' tucked away among the digits. This is just a way of expressing very small, or very large, numbers, without having to use lots of zeros. In this notation the number is separated into two parts — the first part denotes the actual numerical value and the second part, called the exponential value, indicates its magnitude. For example,  $4E8 = 4 \times 10^8 = 400000000$  or  $4E-5 = 4 \times 10^{-5} = 0.00004$ .

Let us now return to our original problem of

evaluating 3 to the power of 3. Instead of the correct answer of 27, the computer has, in fact, evaluated the result as 27.00000014991161. Unfortunately, although the spurious decimal value is not displayed, it is still held in the computer's internal memory and will influence any IF/THEN decisions made upon it.

The reason for this is the computer's use of its own logarithmic function in evaluating powers. Since logarithms are numbers which cannot be expressed exactly as decimals, their use entails certain inaccuracies.



### Puzzle No 13

At the far reaches of the universe, in the galactic nebula NGC143 is the distant star alpha-epsilon. Around this star orbits the inhabited planet of Mongo.

This planet possesses four perfectly spherical moons: Re, Mi, Fa, and So. It has recently been discovered that the volume of Re, the largest of the moons is exactly equal to the sum of the volumes of the three smaller moons — all of which are of different sizes. Latest research indicates that the radii of all four moons can be measured in an exact number of 'mung' (Mongoose units of length).

What are the smallest radii possible for the four moons of Mongo (in mungs)?

### Rules

The winner of the puzzle will be the reader who, in the opinion of Popular Computing Weekly,

has submitted the best solution. Preference will be given to solutions which show how the entrant arrives at the correct answer.

Envelopes containing entries should be marked clearly with PUZZLE.

The closing date for the competition is Tuesday 7 July 77.

### Solution to Puzzle No 9

By making a few trials it can be seen that the maximum value,  $X_{max}$ , required lies between 2 and 3. The easiest approach is to start at 2 and increment this value by a small amount using a loop. If  $X$  is found for each value of  $n$  then  $X_{max}$  will be found at the turning point when  $X$  stops increasing and begins to decrease. (This assumes that there is only one such "maximum").

Using such a routine,  $X_{max}$  is found to be equal to 2.71828... This number is a mathematical constant called  $e$ , it is used as the base of the natural or Napierian logarithms.

There is, however, a less longwinded way to solve this problem. Using calculus, take the natural log of both sides and find the differential,  $d(X)/d(n)$ . At the maximum value, assuming  $X$  and  $n$ ,  $d(X)/d(n) = 0$ . This solution is more elegant and does provide the exact answer,  $e$ .

### Winner of Puzzle No 8

The winner is A G Hall, Arncliffe Way, Cottingham, who receives £10.

### Solution to Crossword No 9

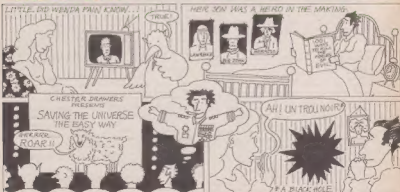
Across: 1 Commodore, 6 Boot, 8 Spectrum, 10 Rescue, 11 Mixer, 13 Trolls, 15 Brassie, 16 Sander, 18 Dodo, 19 Tangarine.  
Down: 2 Optic, 3 Mase, 4 Dream, 5 Rat, 6 Forstran, 7 Superseds, 12 Stand on, 18 Slang, 19 Sner, 17 CIA.

### Winner of Crossword No 8

The winner is G. Wood, Lawson House, London W12, who receives £10.

## CITIZEN PAIN

BY DAVID IRELAND AND JAMES MACDONALD



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